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Cichlidogyrus parasitic infection and its potential role in the diversification of its cichlid fish host

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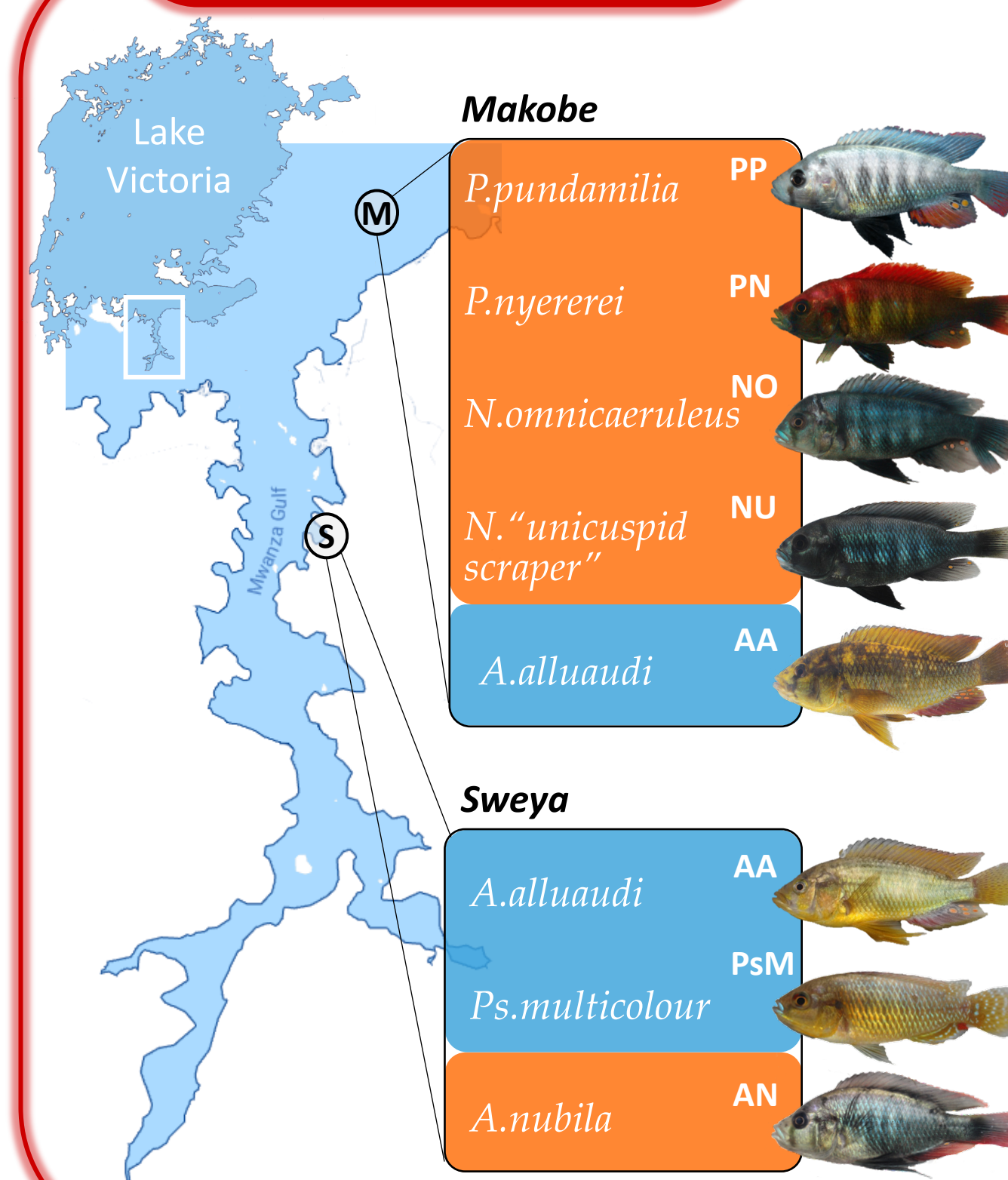
INTRODUCTION

Parasites may promote the evolutionary diversification of their hosts, by engaging in arms races with host populations. Lake Victoria cichlids and their parasites are a good system to study this process. One lineage of cichlids has rapidly made a **large species radiation** while others have **not speciated at all**. Cichlids of both groups are infected by *Cichlidogyrus* spp., a cichlid-specific monogenean gill parasite that has undergone its own radiations. We compare cichlids of **radiating** and **non-radiating** lineages to test predictions of diversification and co-diversification.

If *Cichlidogyrus* is involved in host diversification, then we expect

- reduced infection abundance and lower parasite diversity in **species of the radiating lineage**, resulting from specific resistance evolution.
- different infection profiles amongst **species of the radiation**.

METHODS



Cichlidogyrus flatworms were isolated from gills of wildcaught fish and their morphology was assessed under a microscope.

Conducted for two fish communities (Makobe, Sweya), each composed of sympatric host species, that are **part of the radiation** or **not part of it**.

RESULTS

At Makobe, *Cichlidogyrus* load is higher in the **non-radiating** than in the sympatric **radiating species**; but not at Sweya, where the overall worm abundance is lower.

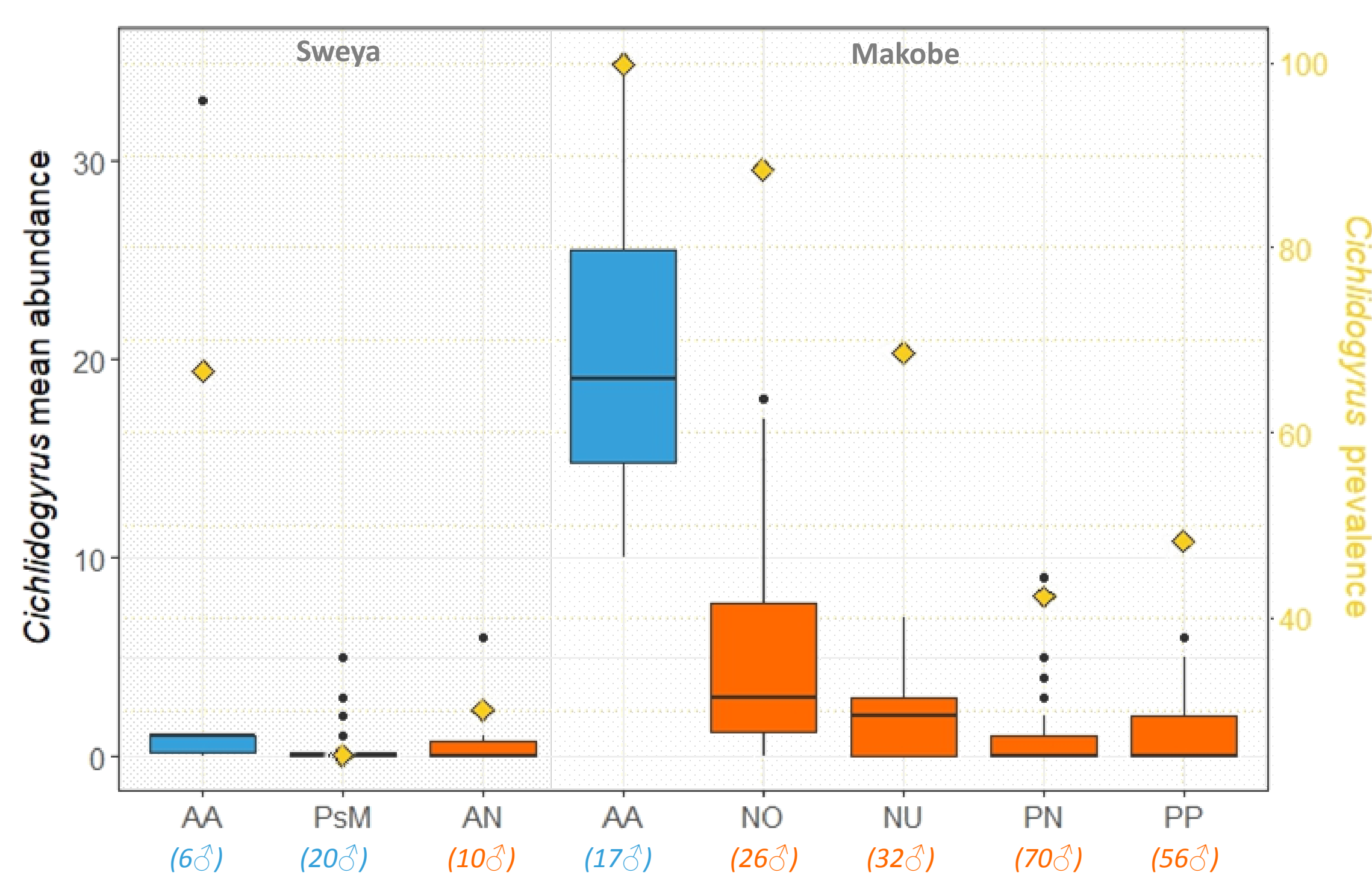


Fig. 1: *Cichlidogyrus* mean abundance (nr of worms) and prevalence at Sweya and Makobe. Nr of host individuals in brackets.

Cichlidogyrus community differs between the **two lineages**, between the two **non-radiating species**, but not among **radiation members**. Worm diversity of the **latter** is not lower than the **non-radiating species**. Worm community is associated with host species rather than sampling location.

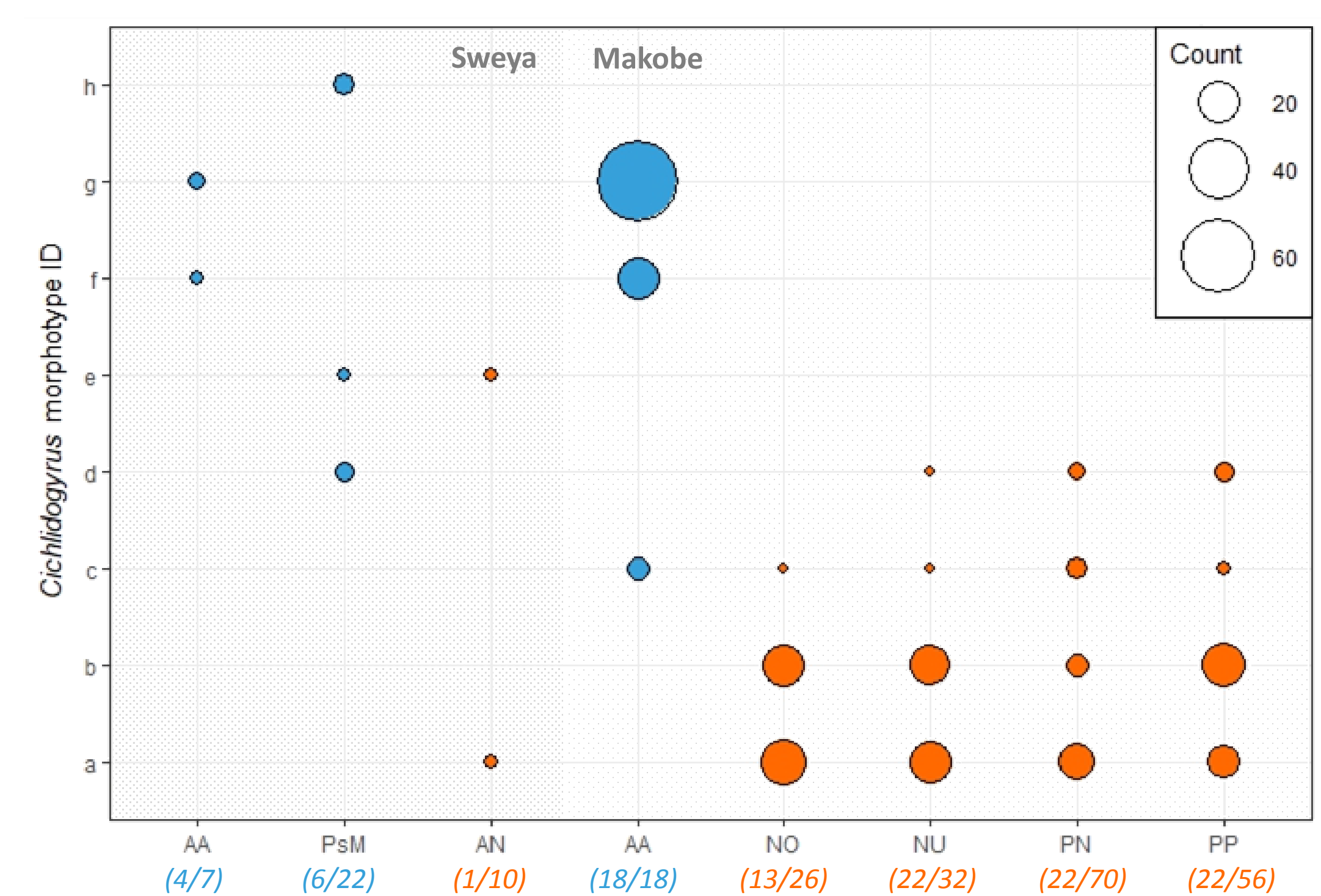


Fig. 2: *Cichlidogyrus* morphotype distribution at Sweya and Makobe. Nr of individuals infected/total in brackets.

To assess differences among **radiation members**, we added 7 host species at Makobe. *Cichlidogyrus* load is significantly higher in algivores than in other trophic groups (excepted one insectivore).

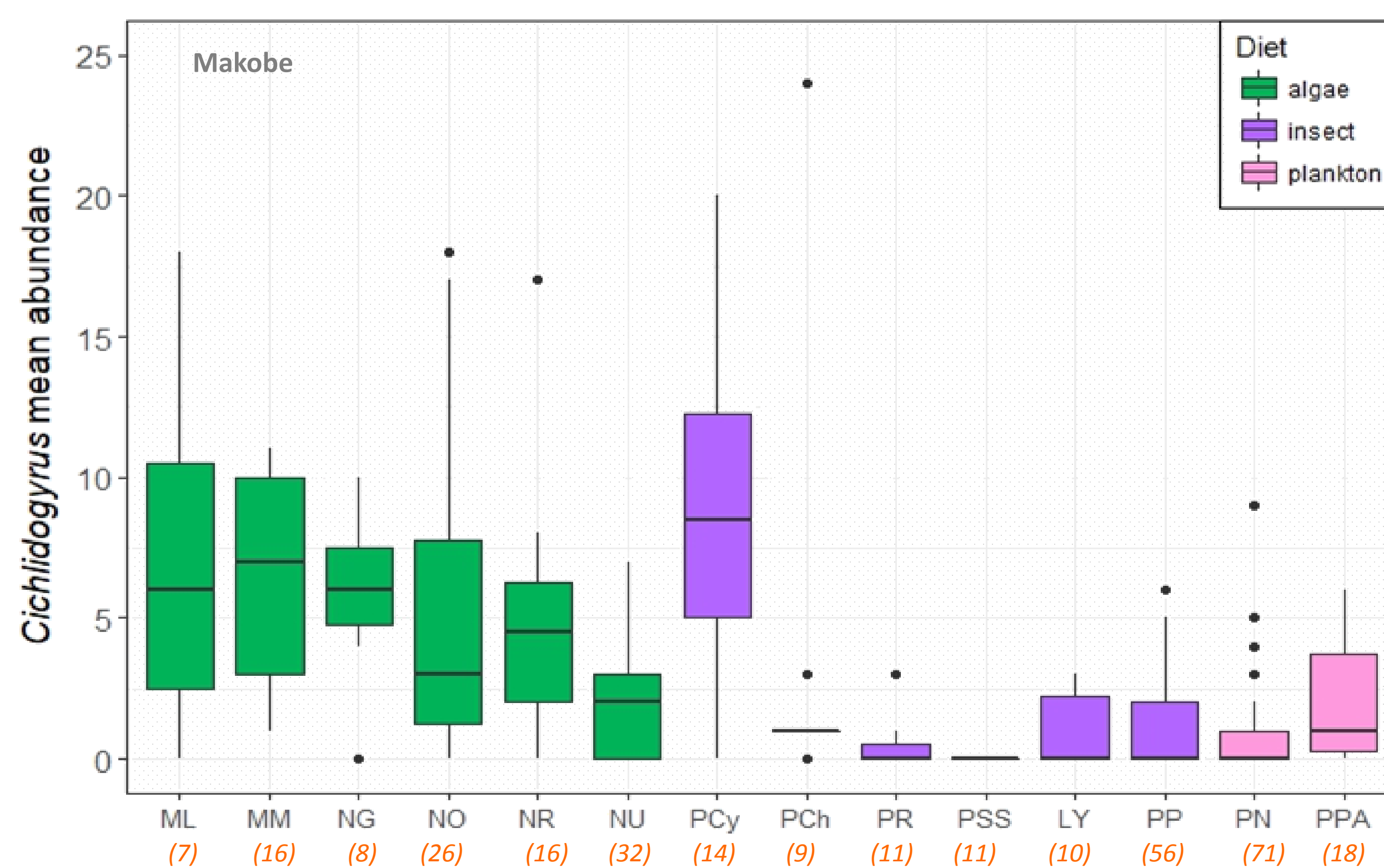


Fig. 3: *Cichlidogyrus* mean abundance (nr of worms) at Makobe in **radiation members**. Nr of host individuals in brackets.

CONCLUSIONS

Cichlidogyrus load is lower (**fig.1**) in the **cichlids of the radiation** than in a sympatric **non-radiating cichlid**, but not at the Sweya site where the overall worm infection is lower. **Radiating** and **non-radiating** lineages are infected by a different subset of parasite species (**fig.2**), suggesting they may be resistant to some of the species that infect the other lineage.

A. alluaudi is infected by the same morphotypes at two distant locations, suggesting parasite species-specificity. **Infected radiating hosts** do not differ in their parasite species composition, inconsistent with a co-diversification scenario.

Cichlidogyrus abundance varies between **host trophic groups** (**fig.3**), suggesting that variations in worm abundance may be explained by differences in exposure.

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